

## One-year tracking data and behaviour of a released hand-reared Moose (*Alces alces*) in Forest Lapland

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It is evident that moose (*Alces alces*) perform seasonal return migrations between winter and summer habitats which can be 15 km or more apart (ZHIRNOV 1969; PULLIAINEN 1974). At the same time, the moose provides evidence for the basic concepts of the familiar area hypothesis (see PULLIAINEN 1974; BAKER 1978). In this context the natural behaviour of moose which have not learned the traditional migration patterns from their mothers are of special interest.

An opportunity arose in the spring of 1989 to carry out an experiment of this kind by releasing into the wild conditions of Finnish Forest Lapland a moose which had lost its mother as a newly born calf in a traffic accident and had been raised in captivity at the zoo attached to the Department of Zoology at the University of Oulu. The animal had been hand-reared to the extent that it had totally lost its shyness towards human beings.

The moose, a female called Suvi, was taken to the northernmost part of the district of Salla in southeastern Finnish Forest Lapland adjacent to the Soviet frontier on October 4, 1990 and released, furnished with a radio transmitter on a collar. This area is characterized by coniferous, mixed and birch forests of the taiga type and isolated fells and marshes of varying size. The release site is one of the overwintering centers for moose in this region (PULLIAINEN 1974). Suvi was followed as closely as possible after her release. She occasionally disappeared, but always reappeared. The one-year tracking data are shown in the figure. The most interesting observations were as follows:

5-7. 10. 1990: Moved in a very restricted area, was lame in her right fore-leg, was probably feeding on willows; 18. 10.-1. 12.: Was seen with a herd of semi-domestic reindeer on 22. 10. and with a herd of three male moose six days later. Suvi allowed the observer to touch her, but the others escaped to a distance of about 30 m. These moose soon left Suvi, and she then moved about alone, although she was seen with an adult female moose on 1. 12. She had been feeding on juniper. Suvi came to greet both our technicians and a group of hunters (who did not kill her), and eventually all of them ran away; 10. 12. 1990-15. 3. 1991: At the beginning of this period Suvi was together with the female mentioned above, but after the turn of the year she was seen together with three and then four other moose. They had been feeding on juniper and birch. All the moose escaped to a distance of some tens of metres (the technicians were travelling by snow scooter). In late January-early March Suvi was alone, feeding on pine, birch and juniper. For some time she had difficulties with snow which had frozen on her head and kept at a distance of 9-10 m; 22.-26. 3.: Suvi was alone and had been feeding mainly on pine (also some birch); 4.-18. 4.: Suvi was seen three times together with an adult female and her calf. All of them ran away from the snow scooter. They had been feeding on pine and birch; 30. 4.-28. 5.: Suvi was still with the adult female and her calf. They had been feeding on pine and juniper; 5.-25. 6. Suvi was found alone (the adult female had probably given birth to a new calf). Suvi now followed our technicians in the forest and was seen feeding on willows,

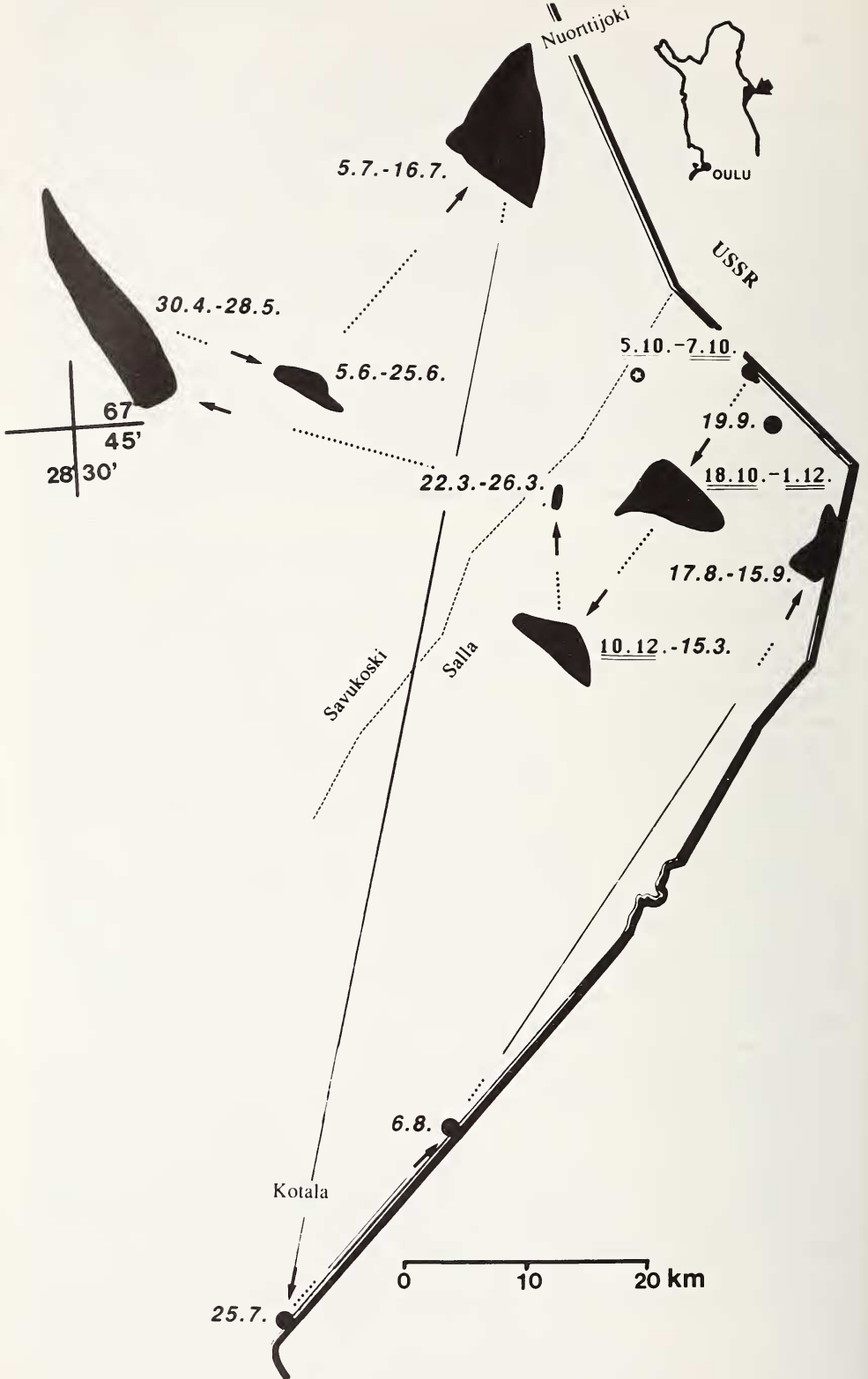
birch leaves and cowberries. She was in a rather poor condition; 5.-16. 7.: Suvi was still alone and was seen feeding on birch leaves. She did not come near the technicians; 25. 7.: A frontier guard saw Suvi alone at a point about 100 km away from the previous observation site. Suvi had covered this distance in 9 days at the most; 6. 8.: Again a frontier guard sighted Suvi alone; 17. 8.-15. 9.: On the 17th of August Suvi was together with six male and one female moose, but she was alone again on the 20th of August and came to greet the technician and followed him for 300 m. She was feeding on willows and fireweed, *Epilobium angustifolium*. On 23rd of August she was together with an adult male, and now ran away to a distance of 150 m. Three days later the number of her companions had increased to three, the flight distance remained the same. One of them was a male. On the 31st of August she was again seen with three other moose (two adult males and a yearling), and three days later with four adult male moose, all of which ran away. On the 19th of September Suvi was alone and came to look at the technician, allowing him to touch her.

Suvi's life in the wild began in an interesting way, since she first joined a herd of semi-domestic reindeer, having seen reindeer previously in the nearby enclosures in the zoo but no other moose. She soon discovered her real conspecifics, however, and later on sought only the companionship of other moose, although large numbers of reindeer were grazing in the same area. She tended to join all kinds of groups of moose and then leave them again (or be rejected for some reason). This also means that wild moose accepted Suvi into their group, at least for a time.

Suvi was faced with a difficult decision when accompanying other moose, as a human being approached. Usually an animal such as a moose will either flee or attack when approached by a wolf, for instance, but here the choice was between escape and approaching the human being, to which she had been conditioned in her early life. Usually Suvi ran away with the wild moose, but soon afterwards, when alone, she would come to greet the technician. It is significant that one year of life in the wild did not change her attitude towards human beings to any extent. She remembered their habits, and all her associations acted in favour of continuous companionship with human beings. It is also noteworthy that the other moose associated with Suvi also showed a surprising short flight distance, even as short as 30 m. CEDERLUND et al. (1981), among others, recorded flight distances varying between 200 and 300 m depending on the approach pattern of human beings. Perhaps in the case of Suvi her presence and behaviour towards human beings shortened the flight distance of the other moose.

Our earlier research has shown that the local moose can be classified into two ecological groups, residents and migrants (PULLIAINEN and LOISA 1967; LOISA and PULLIAINEN 1968; PULLIAINEN 1974). The releasing site, at Tuntsa, has long been a typical overwintering area for moose (VESTERINEN 1940; PULLIAINEN 1974), and moose were overwintering there on this occasion as well. The majority of the local moose migrate to the south or southwest in the spring, however (VESTERINEN 1940; PULLIAINEN 1974), and Suvi spent the summer alone in the area to the west, which also is a typical overwintering area. In late July she suddenly moved a hundred kilometres further south to an area where many moose spend their summers, to return to Tuntsa in August, meeting a group of moose which had either spent their summer there or migrated to the overwintering area. We had found earlier that the autumn migration can commence before there is any snow on the ground (PULLIAINEN 1974).

We have carried out many investigations into the food biology of the moose in this area (PULLIAINEN and LOISA 1967; LOISA and PULLIAINEN 1968; PULLIAINEN et al. 1968; TANHUANPÄÄ and PULLIAINEN 1975), and the present observations support our previous findings on the diet of the moose during different seasons.



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*Fig.* Movements of the moose Suvi between the 5th of October 1990 and the 19th of September 1991. Movements are indicated with arrows and dotted lines. Black areas with dates are the minimum areas in which Suvi lived during the period in question (dates in 1990 underlined). For further details, see text